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ent aspect of words: they serve our purpose very well as they are, and we are inclined to deprecate any alteration, lest it might give a foreign or a mutilated look to what is now familiar and symmetrical to our eye. We should not think of ourselves at all in this matter, but think only of the helpless juvenile throng who crowd into the places which we vacated years and years ago. Simplify spelling for the sake of the little ones who must suffer from our neglect.

One other point calls for notice; namely, the moderate character of the present proposal. The full amount of change that can result from this measure of simplified spelling is but a small part of what is necessary to make the writing of our language phonetic. We shall still have to use double letters for single sounds in a large proportion of both vowels and consonants, and to tolerate many irregularities in such compounds. In fact, the utility of a purely phonetic initiatory method, such as that of "World-English," will be still almost as marked as it is now.

Why, then, advocate this measure? Because it is a step in the right direction, and step by step is the best mode of making progress. There is more to be done than can be effected by one impulse, and improvements once commenced will be carried farther and farther by succeeding generations. Our language is apparently destined to spread over the world. It is worthy of the most perfect vehicle of communication that skill can devise. If we cannot complete the work, we can at least help it on, and leave it one stage more advanced than we found it.

Something must be done. Our spelling is a disgrace. Responsibility for its lawless condition attaches nowhere in particular, but rests everywhere. The burden of this responsibility should be laid on some accountable official empowered to consider and inaugurate improvements. In the absence of any such delegated authority, the direct action of the representatives of the people is invoked, not to impose changes on the unwilling or the indifferent, but only to exemplify, and by example to invite adoption of the method of improvement recommended by competent advisers.

Private efforts have already been most liberally devoted to the work of amending orthography; but no private efforts can be made on the scale, or with the influence, of a measure emanating from Congress. Besides, this work is peculiarly of public and not of private benefit. It must be done by you, or else it must remain unaccomplished.

HEALTH MATTERS.

The Bacteriology of Whooping-Cough.

At the third general meeting of Russian medical men at St. Petersburg, Professor Afanasiéff read an able and exhaustive bacteriological essay on the subject of pertussis. At the suggestion of Professor Afanasiéff, who was anxious to verify his results, Dr. Semtchenko took up the line to further investigate the matter, especially in clinical regards. The conclusions arrived at by the Kazan paediatrician, says the *London Medical Recorder*, may be given thus: 1. Afanasiéff's bacterium is actually specific, and hence fully entitled to bear the name of the *bacillus tussis convulsivæ*; 2. The micro-organism makes its appearance in the sputum during the catarrhal stage, somewhere about the fourth day of the disease, but possibly still earlier; 3. Subsequently its numerical strength increases, the intensity of paroxysms keeping pace with the increase; 4. The microbes disappear from the discharge, apparently somewhat before a complete cessation of whoops (about the time when the number of paroxysms sinks down to four or two per day); 5. As soon as pertussis becomes complicated with catarrhal pneumonia, the bacilli in the patient's sputa show an enormous increase in number; 6. Altogether, the pertussis pneumonia seems to be quite different from other varieties of pulmonary inflammation; 7. The *bacillus tussis convulsivæ* presents a great importance not only in etiological and diagnostic, but also in prognostic regards; 8. As to the behavior of the microbe toward antiseptic agents, its vitality is destroyed as soon as

the medium (jelly) contains corrosive sublimate in the proportion of 1 to 60,000, or resorcin in that of 1 to 1,200, or phenol in the same one, or hydrochlorate of quinine in that of 1 to 800. Drs. Afanasiéff's and Semtchenko's researches were repeated (at least partially) by Professor Tschamer (*Wiener med. Wochensch.*, No. 17, 1888) and Dr. E. C. Wendt of New York (*Medical News*, June 2, 1888). On the whole, both of the authors confirmed the statements made by the Russian observers. Dr. Wendt, however, differs from Dr. Semtchenko in some more or less subordinate points. Thus, he could not detect the presence of the bacilli in earlier stages of the affection; neither was he able to notice any co-relation between the number of paroxysms and that of the bacteria in the patient's sputa; while, on the other hand, he found still the bacilli in the discharge, even after a complete disappearance of whoops. In conclusion, Professor Afanasiéff draws attention to the several points which demand further elaborate investigations. It is necessary, he says, (1) to more closely examine the distribution of the microbes in the respiratory mucous membrane, as well as in broncho-pneumonic foci; (2) to study the behavior of the bacterium toward various coloring-matters (in order to discover a characteristic differential test for the bacillus); (3) to study the spore-formation (which is important, especially in prophylactic regards); (4) to most carefully inquire into a clinical bacteriology of the pertussis sputa from the beginning to the end of the attack, and even during convalescence (which is important for diagnostic, prognostic, and prophylactic purposes); and (5) to further study the behavior of the bacillus toward all possible parasiticide agents (to possibly discover some specific bactericidal substances, which discovery would prove of untold value in regard to the therapeutics of the infantile scourge in question).

[Sea-Water and the Nutrition of Marine Animals.

Drs. Pouchet and Chabry have recently conducted some experiments of great biological interest. They have reared larval germs of sea-urchins in artificial sea-water and in sea-water deprived of all or more or less of its lime, in order to observe the influence of the composition of the water on the development of the larvæ. Normally a distinct skeleton should develop. According to the *British Medical Journal*, it was found, that, when the larvæ were reared in sea-water deprived of about nine-tenths of its lime, not even a rudimentary skeleton was developed. A very trifling diminution in the normal amount of lime, effected by careful precipitation by chemical re-agents, was found sufficient to interfere markedly with the growth of the skeleton in the larvæ: hence the medium in which some marine germs of life exist would appear to act as a nutritive agent as well as an atmosphere whence oxygen may be obtained for respiration. The influence of the chemical composition of the water in different seas probably determines many differences in the anatomy of marine animals, but Drs. Pouchet and Chabry admit that this question requires much consideration. How far the embryo in the higher terrestrial forms of life may receive nutrition direct from substances in solution in the *liquor amnii*, as well as through the placental circulation, is another question worth solving.

NOTES AND NEWS.

PROFESSOR C. S. PLUMB of Knoxville, Tenn., has accepted the position of vice-director of the Agricultural Experiment Station of Purdue University, Lafayette, Ind., and after the 1st of April next his address will be at the latter place.

— At a recent meeting of the Paris Geographical Society, as we learn from *Nature*, an interesting lecture was delivered by Dr. Hamy on the history of scientific missions in France under the old monarchy. He commenced practically with the reign of Francis I., and described many missions abroad, with purely scientific aims, which are now either forgotten, or the results of which have never been published. Thus, the apothecary to Henri IV. went all over the globe in search of the peculiar products of each country, especially medicinal and food plants; still earlier,

another explorer went to Brazil to study dyeing woods; and, in the last century, Condamine, Dombey, Bougainville, and La Pérouse went on their well-known expeditions. The president, Comte de Bisemont, mentioned that there were still in the archives of the Ministry of Marine copies of the instructions given to travellers and navigators in past centuries, and that these were "positively models of their kind, which could not be followed too closely now." Professor Bureau, of the Museum of Natural History in Paris, observed that a botanical collection made by Paul Lucas in the reign of Louis XIV. still existed in the museum; and he referred especially to Tournefort, of the same period, whom he described as the scientific traveller of former times who perhaps most nearly approached moderns in his methods of observation. He was sent by the king on a botanical expedition to the Levant, with very precise instructions, among others, to collect and observe the plants mentioned by the ancients. He did not confine himself to this, but formed a complete herbarium, which is still preserved at the museum, and is one of its treasures. He was accompanied by an artist named Aubriet, who brought back a large collection of colored sketches, which forms an important part of the unrivaled collection in the library of the museum.

— The fifteenth session of the Sauveur College of Languages will be held at the University of Vermont, Burlington, Vt., commencing at 8 A.M. on Wednesday, July 9, and continuing six weeks. The situation of Burlington on a hill which slopes down to Lake Champlain, and the frequent fresh breezes, make the climate in summer cool and healthful. It is a place of great natural beauty, and the University of Vermont commands a most beautiful view. Mansfield and Camel's Hump of the Green Mountains, the noble range of the Adirondacks, and the lake with its islands, form a picture which will delight all. The university is a new and handsome building. It contains collections in various departments of knowledge, and a valuable library. The instruction of the college will include, for the adults, French, German, Italian, Spanish, modern Greek, and Romance languages; Latin and ancient Greek; comparative grammar of the English language and the formation of modern English; English literature and rhetoric. There will be each day, for the adults, seven hours of French, seven of German, three of Latin, three of Greek, three of Italian, two of Spanish, one hour each of English literature and rhetoric, comparative grammar of the English language, and the formation of modern English; for the children, two hours of French and two hours of German. The classes will meet every day except Saturday, and the lessons will be given from 9 A.M. to 1 P.M., and from 4 P.M. to 5 P.M. Saturdays will be devoted to recreation. Excursions will be arranged for, at moderate rates, to Ausable Chasm, Mount Mansfield and Camel's Hump, Lake George, Montreal, and other places of interest. Those who purpose attending the College of Languages, or who know but little of this summer school, are recommended to send for a copy of the programme, which may be had at the bookstores of F. W. Christen, New York; Carl Schoenhof, Boston, Mass.; John Wanamaker, Philadelphia, Penn.; Robert Clarke & Co., Cincinnati, O.; and will be sent to applicants by Dr. A. N. van Daell, 28 Atherton Street, Roxbury, Mass.; Dr. William Bernhardt, City High School, Washington, D.C.; Dr. James H. Dillard, Mary Institute, Washington University, St. Louis, Mo.; or Dr. L. Sauveur, Copley Terrace, Roxbury, Mass.

— The stay of some 306 natives from various French colonies, etc., for about six months, in Paris last year, in connection with the exhibition, was an interesting experiment in acclimatization. According to *Nature* of March 6, owing to wise hygienic measures (such as vaccination, good water-supply, isolation of closets, and surveillance of food), these Annamites, Tonquinese, Senegalese, etc., seem to have escaped most of the common endemic diseases. According to the *Semaine Médicale*, they had no typhoid-fever, scarlatina, or measles, though these were in Paris at the time. Some 68 natives were attacked by mumps. The fatigues of a voyage and the change of climate led to a recurrence of intermittent fever, with grave symptoms, in twenty cases. It was thought at first to be typhoid-fever of a severe type; but the rapid and

durable efficacy of sulphate of quinine, given in doses of two to three grams a day, proved the paludine nature of the disorder. It is noteworthy that most illnesses of this population, especially that just noticed, and those from cold, appeared during the first part of the time, when the weather was mild; while in the second period, with unfavorable atmospheric conditions, the illness diminished, whether owing to precautions in the matter of dress and food, or to more complete acclimatization. The negroes of Senegal and the Gaboon seem to have been the greatest sufferers, while the Indo-Chinese race acclimatized the best.

— There are in Berlin 16 *Gymnasia*, — 5 government and 11 municipal *Gymnasia*. The government *Gymnasia* are those of which the expenses are wholly or partly borne by the government. In the 5 government *Gymnasia* there are 82 classes with 3,194 pupils; in the 16 others there are 165 classes with 5,887 pupils. There is one government *Realgymnasium* with 15 classes and 665 pupils, and seven municipal *Realgymnasia* with 102 classes and 3,982 pupils. There are 2 *Ober-realschulen* and 5 higher burgher schools, all municipal. There are 7 high schools for girls, having 114 classes with 5,210 pupils. These 7 schools for girls, compared with the 31 schools for boys, are altogether inadequate. Private schools for girls have therefore sprung up in all parts of the capital, but they are all subject to the inspection of the school committee. There are more than 48 private high schools for girls, with 11,493 pupils. As a bridge between the higher and the lower schools, there are the so-called *Gemeindeschulen* (municipal schools). In these, pupils are specially prepared for the higher schools, and some are directly connected with them. They number 22, and contain 80 classes with 4,105 pupils. Besides these, there are 15 private schools with 116 classes and 3,832 pupils, mostly preparing for the higher schools. A few private elementary schools were kept going through the deficiency in the number of public schools. The municipality placed in them its surplus school population and paid the fees. But the chief *raison d'être* of these schools disappeared with the abolition of school fees and the introduction of free elementary education. Their day is past, and there will no longer be any complaints about the inefficiency of the teaching given in them as compared with that in the public schools. The present cry in Berlin is for more schools and smaller classes. The latter complaint, indeed, is not confined to Berlin, but is becoming general in all parts of the country. The abnormal growth of the capital since 1870 has rendered it very difficult for the municipality to keep pace with the population and provide enough schools. The number of classes in Berlin of overgrown size has risen in the space of one year, 1888-89, from 55 to 106. The cause of this is the thinning of the ranks of the elementary teachers through the low rate of salaries.

— A curious phenomenon is reported from Batoum, says *Nature*. On Jan. 23, at 4 P.M., during a complete calm, the sea is said to have suddenly receded from the shore, leaving it bare to a depth of ten fathoms. The water of the port rushed out to sea, tearing many of the ships from their anchorage, and causing a great amount of damage. After a short time the sea assumed its usual level.

— The Boston Manufacturers Mutual Fire Insurance Company reports the causes of 206 fires occurring during 1889, as follows: foreign matter in stock, 45; picker fires (unknown whether foreign matter or friction), 23; friction of stock, 17; hot journals, 17; spontaneous ignition of oily material, 15; spontaneous ignition of dyes, 12; chafing of belt, 5; gas-jet, 5; kerosene-lamp, 4; matches, 3; lightning, 3; steam-pipes, 3; rocket, 1; sulphur bleach, 1; electricity from belt, 1; overheated oven, 1; sparks from broken machinery, 7; sparks from chimney, 3; sparks from cupola, 2; sparks from forge, 2; sparks from burning building, 1; sparks from locomotive, 1; sparks from boiler-setting, 1; sparks from furnace, 1; sparks from core-oven, 1; sparks from card-grinder, 1; back draught, 3; derailed train, 1; various fires in mill tenements, 3; suspected incendiary (two by insane persons), 5; unknown, 18. The times of starting of the fires were as follows: day, 151; night, 39; unknown (all extinguished without claim), 16. The property was classified as follows: cotton-mills, 115; woollen-mills, 39; machine and metal works, 15;

hosier-mills, 9; storage, 7; paper-mills, 5; bleach and dye works, 3; tenements, 3; jute factories, 2; rubber-works, 2; silk-mill, 1; linen-mill, 1; cordage-works, 1; miscellaneous, 3. The processes where the fires started were as follows: cotton-picker, 58; wool-picker, 19; mules, 16; cotton-drier, 7; wood-drier, 6; cotton-card, 6; shafting, 6; spinning-frames, 4; fly-frames, 4; boiler-house, 4; looms, 3; engine room, 3; wool-card, 2; blacksmith, 2; office, 2; wheel-pit, 2; sulphur bleach, 1; jute-card, 1; rag sorting, 1; brushing-machine, 1; core-oven, 1; wire drawing, 1; japanning room, 1; wool dyehouse, 1; slasher, 1; card-grinder, 1; storage and miscellaneous, 52.

— Those who are interested in the subject of manual and industrial education may like to read a pamphlet on "Manual Training in the Public Schools of Philadelphia," by James MacAlister, superintendent of the city schools. It is issued by the New York College for the Training of Teachers, and gives an account of the courses in manual training and industrial art that have been in operation for some years in certain of the Philadelphia schools. These institutions, however, — the Industrial Art School and the Manual Training School, — are special schools, consisting of picked volunteer students; so that their success or failure is no criterion of the usefulness of manual training in the ordinary public schools. Both the institutions have had good success in their special field, as such schools usually have had where they have been tried. More recently kindergartens have been established in Philadelphia, with manual training as one of the features, but sufficient time has not elapsed to show the effects of their working. Sewing has been introduced into the higher girls' schools, and with favorable results. Mr. MacAlister's pamphlet will be of interest on special points.

— In Bulletin No. 4 of the Rhode Island Experiment Station, the apiarist gives much information about bee-keeping, and reports the work done in this department the first season. Quotations from crop and other reports of the United States Agricultural Department are given to show the importance of this industry in the United States, while facts and figures from the Rhode Island census for 1885 show its condition in that State. Old-fashioned bee-keeping is compared with modern management, its improved hives and better varieties of bees. The value of bees as honey and wax producers is shown; and their greater value as carriers of pollen from flower to flower, thus fertilizing and causing the fruit to set and mature, is considered, and many opinions and facts presented. The desirability of the cross fertilization of flowers and the aid rendered by insects in this work is shown, as well as the adaptability of the honey-bee to the flowers of the most important fruit and vegetable crops dependent upon insect visits. The question as to whether bees injure fruit is presented; the opinion of the government entomologist that they do not, and an account of the careful experiments carried out under his direction to settle the matter, are given. The views of Professors Packard and Gray, as well as of prominent fruit-growers in Rhode Island, are also given. Attention is called to the decision of the Supreme Court of Arkansas as to the unconstitutionality of prohibiting bee-keeping; also to laws lately passed in Germany which give all land-owners the privilege of keeping bees anywhere, promise protection by civil right and law, as well as punish the destruction of bees by poison or any other way by a fine of \$150 or imprisonment for one year. No one need refrain from keeping bees on account of opposition due to ignorance, fear, jealousy, or the ill will of their neighbors, though all reasonable precautions should be taken to prevent accident. An account of the work done at the station during the limited time allowed for it is given. A yard of ten colonies was established, and made as near as possible a model working apiary. The desirable varieties of bees were procured, a daily record taken of a hive on scales, a show of bees in glass hives made at the county fair, and a collection of the different kinds of hives, fixtures, etc., used by prominent American producers, and designed as a permanent exhibit at the station, was commenced. Sixteen colonies were prepared for winter, — three placed in the cellar, and the rest packed in outer cases on their summer stands. Acknowledgments are made of hives and other articles donated; and samples of different kinds of honey from different parts of the

country, as well as all articles of interest to bee-keepers, are solicited, and will be acknowledged in the bulletin. This work is in charge of Samuel Cushman, and the address is Bee Department, Experiment Station, Kingston, R.I.

— The carbons in the new Westinghouse alternating-current arc-lamps are flat, two inches wide, seven-sixteenths of an inch thick, and eight inches and a half long. The upper and lower carbons are the same size, and are consumed at the same rate. One set of carbons is said to last forty-eight hours.

— A project is on foot to dig a ship-canal from a point opposite Grand Island in Lake Superior to the northern extremity of Green Bay in Lake Michigan, cutting across the narrowest part of the long peninsula between those two lakes. The proposed canal is to be thirty-six miles long, and would save two days and a half for steamers and five days for sailing-vessels that would otherwise have to go around the peninsula.

— The report of the Bidston Observatory for the five years 1884-88 is mainly composed of meteorological observations from which it appears that the anemographs furnish very questionable data. The velocity of the wind has been computed on the assumption that the motion of the anemograph's cups is equal to one-third that of the air. The anemograph's pressure-plate presents a surface of two superficial feet to the wind. Both these anemographs are about 210 feet above the sea-level. The investigations conducted by Sir G. Stokes tend to show that the constant for the cups is not 3, but more probably 2.4; and the experiments made by Dines establish the relation between the velocity and the pressure of the wind to be $P = V^2 \times .0035$, though hitherto it has been considered to be $P = V^2 \times .005$. On Jan. 23, 1884, the pressure of wind recorded at Bidston was 70.2 pounds per square foot, and the velocity 78 miles per hour. Other extraordinary pressures with accompanying velocities are as follows: Oct. 26, 1884, 40.6 pounds and 64 miles; March 30, 1886, 41.9 pounds and 62 miles; Dec. 9, 1886, 40.4 pounds and 69 miles; Feb. 3, 1887, 40.1 pounds and 66 miles; May 20, 1887, 65.2 pounds and 78 miles; Nov. 1, 1887, 40.0 pounds and 57 miles; Jan. 26, 1888, 49.2 pounds and 74 miles; May 3, 1888, 44.4 pounds and 66 miles; Nov. 20, 1888, 49.0 pounds and 71 miles. The five maximum pressures, about 40, averaging 40.6, accompany consistently hourly velocities, averaging 64 miles. Now, if the constant for velocity must be reduced from 3 to 2.4, this 64 becomes 51 miles. According to the old formula, the pressure corresponding to 51 miles would be 13, and according to the new formula only 9 pounds, which numbers are in startling contrast to 40.6. Conversely, accepting 40.6 pounds, the velocity by the old formula would be 90, and by the new formula 108, which figures are in startling contrast to 64 miles. Hence, whichever way the data are considered, the results are eminently unsatisfactory. For a pressure of 70 pounds, the corresponding velocity would be 141 miles per hour by the new formula. Only the highest pressures have here been tested, but similar discrepancies prevail all through the series of these anemological statistics. Assuming these maxima pressures to be correct, then the given velocities are greatly in defect; but as the factor 3 has been employed, which is now considered to be one-fifth too great, the given velocities are just as much too large: hence that which is already great should be greater, — an absurdity which leads to the inference that the instruments are unreliable. The mean velocity per hour is really given, whereas the absolute velocity, expressed as rate per hour, of the most violent gusts, lasting perhaps only a few seconds, is wanted. *Engineering* points out that it seems too much of a stretch of confidence to accept the pressures as reliable, inasmuch as none so high have been obtained anywhere else. The inference, therefore, must be that the accuracy of the anemographs at Bidston is extremely doubtful, and it becomes important to make these apparatus the subject of critical investigation. Until this has been efficiently done, no reliance whatever can be put upon their results, which is very much to be regretted, as the data extend over a long series of years, and if reliable, or could be made so, would be of the utmost scientific value.